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(71) Applicant (for all designated States except US): **UMI-  
CORE AG & CO. KG** [DE/DE]; Rodenbacher Chaussee  
4, 63457 Hanau (DE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **RIVAS-NASS,**  
Andreas [DE/DE]; Am Hundacker 10, 55257 Buden-  
heim (DE). **PETER, Gerhard** [DE/DE]; Jahnstrasse 11,  
63579 Freigericht (DE). **WIDMER, Jürgen** [DE/DE];  
Heidelberger Strasse 27a, 64285 Darmstadt (DE). **BRIEL,**  
Oliver [DE/DE]; Tulpenhofstrasse 25, 63067 Offenbach  
(DE). **KARCH, Ralf** [DE/DE]; Käthe-Kollwitz-Strasse  
24, 63801 Kleinostheim (DE).

(74) Agent: **VOSSIUS & PARTNER**; Siebertstrasse 4, 81675  
Munich (DE).

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(54) Title: DIENE-BIS-AQUO-RHODIUM(I) COMPLEXES, PROCESS FOR PREPARING THEM AND THEIR USE

(57) Abstract: Diene-bis-aquo-rhodium(I) complex of the general formula  $[\text{Rh}(\text{diene})(\text{H}_2\text{O})_2]\text{X}$  where diene is a cyclic diene and X is a noncoordinating anion.

## AMENDED CLAIMS

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Original claims 1-15 unchanged ; new claims 16-20 (3 pages) ]

1. Diene-bis-aquo-rhodium(I) complex of the general formula (1):



where diene is a cyclic diene and X is a noncoordinating anion.

2. Diene-bis-aquo-rhodium(I) complex according to Claim 1, wherein diene is 1,5-cyclooctadiene (COD) or norbornadiene (NBD).
3. Diene-bis-aquo-rhodium(I) complex according to Claim 1 or 2, wherein X is a noncoordinating anion selected from  $\text{BF}_4^-$  and  $\text{CF}_3\text{SO}_3^-$ .
4. Diene-bis-aquo-rhodium(I) complex according to any of Claims 1 to 3 having the name 1,5-cyclooctadienebis-aquorhodium(I) tetrafluoroborate.
5. Diene-bis-aquo-rhodium(I) complex according to any of Claims 1 to 3 having the name 1,5-cyclooctadienebis-aquorhodium(I) trifluoromethylsulphonate.
6. Diene-bis-aquo-rhodium(I) complex according to any of Claims 1 to 5, wherein the complex is in the form of a solid.
7. Process for preparing a diene-bis-aquo-rhodium(I) complex according to any of Claims 1 to 6, which comprises reacting a rhodium(I)-olefin compound with silver salts in an aqueous solvent mixture, characterized in that the silver salt is not added as a solid to the reaction mixture but is instead prepared in solution and added in this form.

8. Process for preparing a diene-bis-aquo-rhodium(I) complex according to Claim 7, wherein the silver salt is prepared in solution by reacting silver oxide ( $\text{Ag}_2\text{O}$ ) with the acid corresponding to the noncoordinating anion of the diene-bis-aquo-rhodium(I) complex.
9. Process for preparing a diene-bis-aquo-rhodium(I) complex according to Claim 8 wherein the acid is used in an excess of up to 0.5 molar equivalents over the silver oxide.
10. Process for preparing a diene-bis-aquo-rhodium(I) complex according to any of Claims 7 to 9, wherein the preparation of the silver salt is carried out in an aqueous medium.
11. Process for preparing a diene-bis-aquo-rhodium(I) complex according to any of Claims 7 to 10, wherein the rhodium(I)-olefin compound is  $[\text{Rh}(\text{COD})\text{Cl}]_2$ .
12. Process for preparing a diene-bis-aquo-rhodium(I) complex according to any of Claims 7 to 11, wherein the aqueous solvent mixture comprises water together with up to 10% by volume of at least one alcoholic solvent.
13. Process for preparing a diene-bis-aquo-rhodium(I) complex according to Claim 12, wherein the alcoholic solvent is selected from methanol, ethanol, n-propanol, isopropanol, n-butanol and tert-butanol.
14. Use of a diene-bis-aquo-rhodium(I) complex according to any of Claims 1 to 6 in catalytic reactions.
15. Use of a diene-bis-aquo-rhodium(I) complex according to any of Claims 1 to 6 for preparing heterogeneous catalysts.
16. Use of a diene-bis-aquo-rhodium(I) complex according to any of Claims 1 to 6 for preparing a chirally nonselective, diastereoselective or enantioselective catalytically

active species.

17. Use according to Claim 16, wherein the diene-bis-aquo-rhodium(I) complex is reacted with achiral and/or chiral ligands with ligand exchange.
18. Use according to Claim 17, wherein the achiral and/or chiral ligands are selected from triphenylphosphine, ferrocenylphosphine, alkylphosphine or chiral phosphine.
19. Chirally nonselective, diastereoselective or enantioselective catalytically active species, obtainable by reacting a diene-bis-aquo-rhodium(I) complex according to any of Claims 1 to 6 with achiral and/or chiral ligands with ligand exchange.
20. Chirally nonselective, diastereoselective or enantioselective catalytically active species according to Claim 19, wherein the achiral and/or chiral ligands are selected from triphenylphosphine, ferrocenylphosphine, alkylphosphine or chiral phosphine.